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SCIENCE

FRIDAY, NOVEMBER 20, 1914

THE MATHEMATICIAN IN MODERN PHYSICS¹

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It is perhaps presumptuous for an experimental physicist to address a body of mathematicians. He can at best appeal. They are the arbiters of his science. They determine the number of cubic feet allotted for his antics. In a genial mood, they may give him the equivalent number of cubic centimeters. Physicists appreciate the clemency. Let nobody contend that there are, *necessarily*, laws of nature. In science, as in civil law, the experts in a measure make the facts. So I appeal to the law-givers of physics, with a purpose of exhibiting something of the method with which they have supposedly treated me, in the past forty years of my experience. If I am obtrusively personal I must be pardoned, for this is the only experience I have to give.

We, the experimentalists, are supposed to be the artists of science, a type of men who reach conclusions by intuition, by a happy leap in the dark. The inventor, the laboratory hermit, parades an essentially feminine type of mind, whereas the eternal masculine, the essentially logical trenchency, belongs to the mathematician. In all humility, however, in the dark recesses of the laboratory, there are skeptics who believe that both the physicist and the mathematician, in the main, follow the method of trial and error; that both develop from idea to idea. The usual outcome in the mathematical case is a huge paper basket, overflowing and standing in the waste; the outcome in the other, a sort of dismal morgue, a junk-shop of botches. Failures have been the rule, successes the exception. But as we flaunt our successes (and they only

¹ From an address given at the dinner of the American Mathematical Society, in Providence, September, 1914, on the occasion of the one hundred and fiftieth anniversary of Brown University, by Professor Carl Barus.